

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
27 May 2004 (27.05.2004)

PCT

(10) International Publication Number
WO 2004/044987 A3

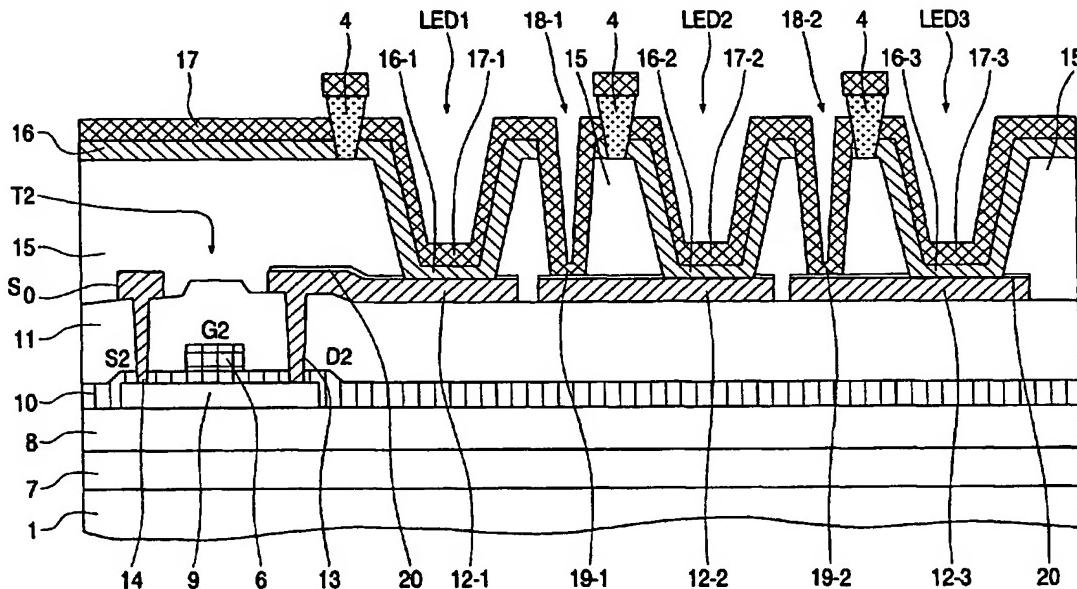
- (51) International Patent Classification⁷: H01L 27/00
- (21) International Application Number: PCT/IB2003/004833
- (22) International Filing Date: 30 October 2003 (30.10.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0226401.8 12 November 2002 (12.11.2002) GB
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: ELECTROLUMINESCENT DEVICES AND THEIR MANUFACTURE



(57) Abstract: An EL device comprising a substrate(11), a light emissive structure comprising three series connected LEDs on the substrate (LED1, 2, 3). Considering the diode LED1, it comprises organic light emissive material disposed (16-1) between an underlying ITO anode (12-1) and an overlying cathode (17-1) that is electrically connected in series to the underlying anode (12-2) of the diode LED2 through the thickness of the organic light emissive material (16-1). The connection can be made by using a wetting agent to prevent the organic light emissive material disposed (16-1) covering contact region (19-1) on the anode (12-2) so that the overlying cathode (17-1) can make a series connection with the underlying anode (12-2).

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MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
11 November 2004

Published:
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/04833

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L27/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 02, 5 February 2003 (2003-02-05) -& JP 2002 313572 A (TOYOTA MOTOR CORP), 25 October 2002 (2002-10-25) abstract	1,6-9, 16,17
A	EP 0 717 446 A (EASTMAN KODAK CO) 19 June 1996 (1996-06-19) cited in the application the whole document	1,2,9
A	US 6 107 734 A (TANAKA SHOSAKU ET AL) 22 August 2000 (2000-08-22) figure 4	1,6-9, 16,17

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the International search

20 August 2004

Date of mailing of the International search report

30/08/2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/04833

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 2003/117348 A1 (HUNTER IAIN M ET AL) 26 June 2003 (2003-06-26) cited in the application abstract; figure 2 -----	1,2,6-9, 16,17

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/04833

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
JP 2002313572	A 25-10-2002	NONE		
EP 0717446	A 19-06-1996	US 5684365 A EP 0717446 A2 JP 8234683 A		04-11-1997 19-06-1996 13-09-1996
US 6107734	A 22-08-2000	JP 11329748 A		30-11-1999
US 2003117348	A1 26-06-2003	WO 03054844 A1		03-07-2003